PortShare

User Manual

Rev: 1.3

August24th 2010

Opengear's serial port sharing software (*PortShare*) delivers the virtual serial port technology your Windows and Linux applications need to open remote serial ports and read the data from serial devices that are connected to your *console server*.

PortShare is supplied free with each *console server* and you are licensed to install *PortShare* on one or more computers for accessing any serial device connected to any Opengear *console server* port. So one user can access multiple remote serial devices in multiple locations, and multiple users can access the same remote serial device.

Publishing history

Date	Revision	Update details
Oct 2009	1.0	Initial release of PortShare (Windows)
Dec 2009	1.1	Linux driver documentation added
Feb 2010	1.2	License agreements included
Aug 2010	1.3	Encrypted Windows added

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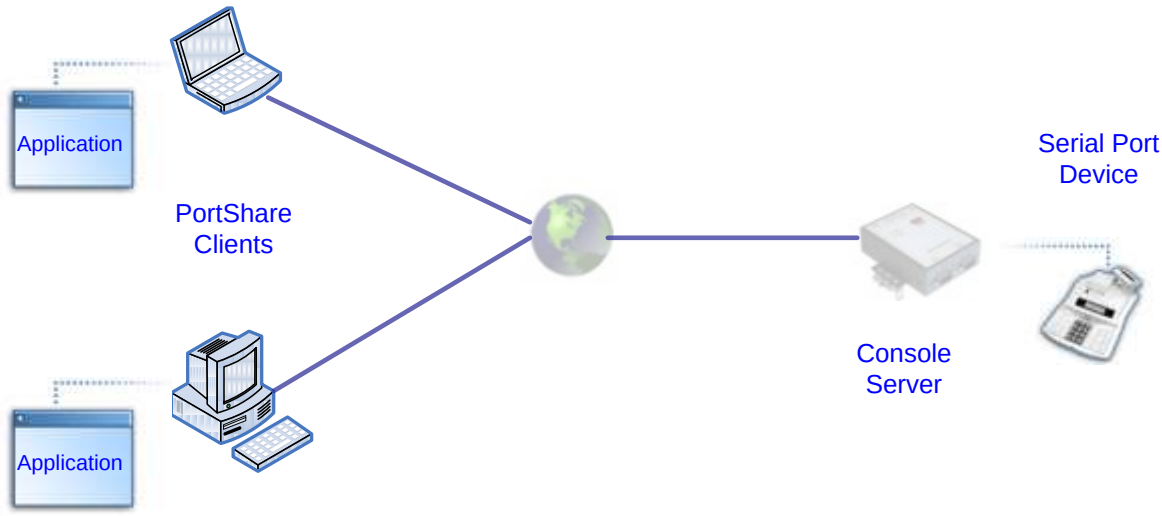
1. *PortShare* for Windows

PortShare establishes secure client-server connections between the serial ports on remote *console servers* and applications on your Windows PC or server servicing COM ports.

Once connection is established, all data sent to the nominated COM port on the Windows computer will be immediately redirected and delivered out the corresponding serial port on the *console server*. Similarly incoming data on the *console server* serial port is redirected to the virtual COM port on the Windows computer where it can be processed further.

You are licensed to install *PortShare* on one or more computers for accessing any serial device connected to any Opengear *console server* port.



1.1 Install the *PortShare* client

PortShare is fully compatible with 32 bit and 64 bit versions of Windows NT 4.x, Windows XP, Windows 2000, Windows 2003, Windows 2008, Windows Vista and Windows 7. The license agreement is included in Chapter 3.

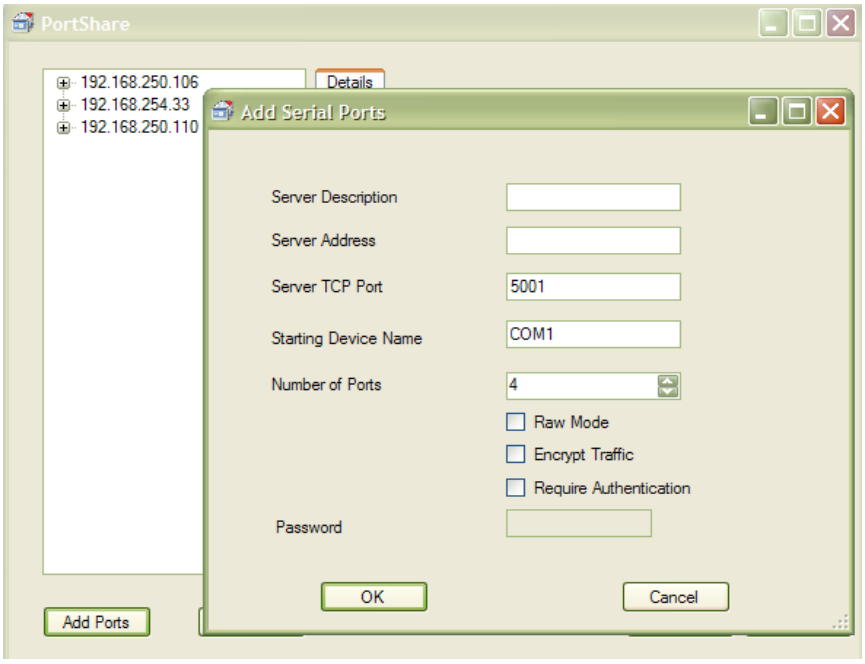
- The *portshare_setup.exe* program is included on the CD supplied with your *console server* (or a copy can be freely downloaded from ftp://ftp.opengear.com.) Double click the *portshare_setup.exe* file to start the installation process

- Read the License Agreement, then follow the prompts to select the destination path and choose the shortcuts you wish to create. Once the installer completes you will have a working *PortShare* client installed on your machine and an icon on your desktop
- Click the *PortShare* icon on your desktop to start the client

1.2 Configure the *PortShare* client

Creating the *PortShare* client connection will initiate a virtual serial port data redirection to the remote *console server* using TCP/IP protocol

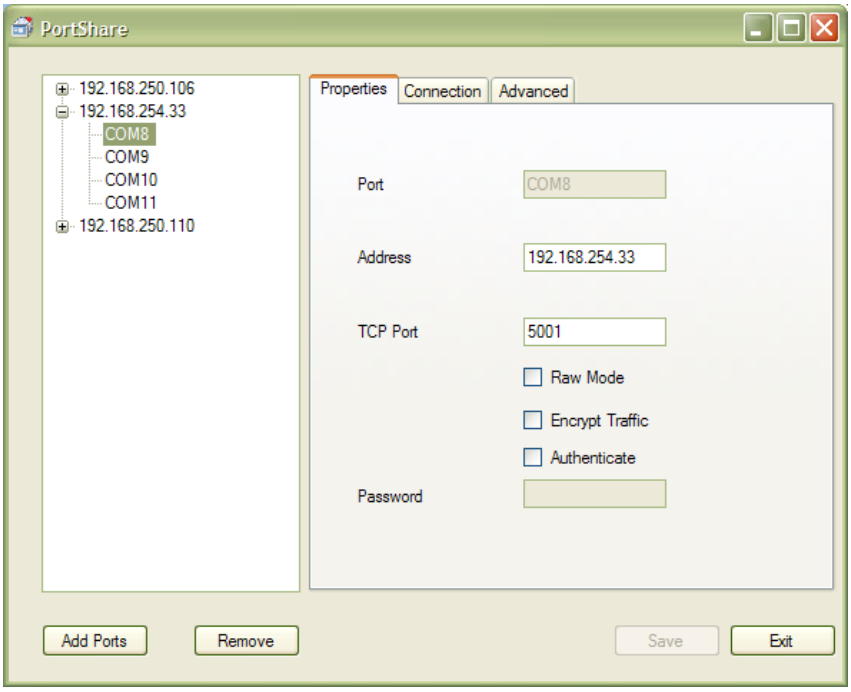
- Click on *Add Ports*
- Specify a name to identify this connection in the *Server Description* field



- Enter the *console server's* IP address (or network name) in the *Server Address* field
- Enter the *Server TCP Port* number that matches the port you have configured for the serial device on the remote *console server*. Ensure this port isn't blocked by a firewall
    - Telnet *RFC2217* mode is configured by default so the range of port numbers available on a 16 port *console server* would be 5001-5016
    - Alternately, check *RAW Mode* to set *Server TCP Port to* 4001- 4048 on a 48 port *console server*
- Select the starting COM port for the *Starting Device Name*. This can be in the range of COM1 to COM4096
- Specify the number of COM ports you want to add in *Number of Ports*. Sequential port numbers will be assigned automatically however, if a COM port number is already being used by other applications than that port number will be skipped
- Check the *Encrypt Traffic* box to enable SSL/TLS encryption of the data going to the port
- To enable authentication, check the *Require Authentication* box. You will be prompted to enter a Password
- Click OK to add the specified COM ports

1.2.1 Configure the COM *Properties*

- To configure a COM port you have created, simply click on the desired COMx label in the left hand menu tree. For example, click on COM8 from the 192.168.254.33 server. This will automatically display the Properties tab on the right-hand side of the *PortShare* window



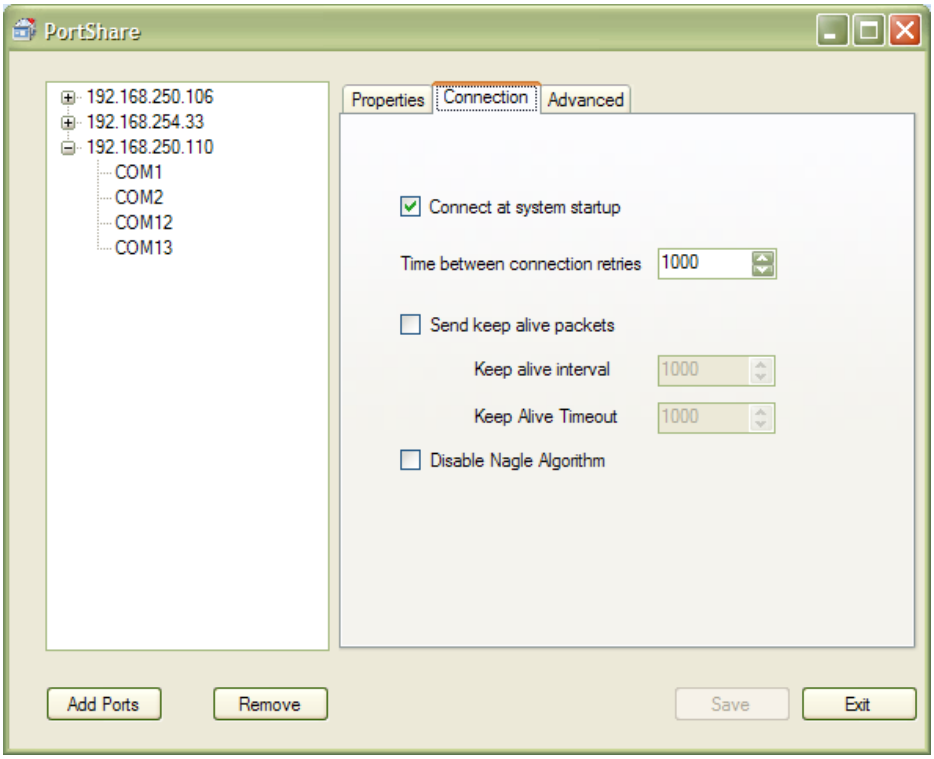
- In the Properties window, you can edit the *IP Address* or *TCP Port* to be used to connect to that COM port
- Check *Raw Mode* to change the *TCP Port* to 4001 in the above example
- Check the *Encrypt Traffic* box, to encrypt traffic on this COM port only.
- Check the *Authenticate* box, to enable authentication on this COM port. This will prompt you to enter a *Password*.
- You can also configure the COM port in the *Connection* and *Advanced tabs*

1.2.2 Configure the COM *Connection*

- Check *Connect at system startup* to connect to the *console server* when the *PortShare* service starts as opposed to waiting for the application to open the serial port before initiating the connection to the *console server*

- The *Time between connection retries* specifies the number of milliseconds between TCP connection retries after a client-initiated connection failure. Valid values are 1000-10000. The default is 1000 milliseconds or 1 second, and *PortShare* will continue attempting to reconnect forever to the *console server* at this interval

- The *Send keep alive packets* option tests if the TCP connection is still up when no data has been sent for a while by sending keep-alive messages. Select this option and specify the period of time (in milliseconds) after which *PortShare* sends a command to the remote *console server* end in order to verify the connection's integrity and keep the connection alive. This option is not available when *Raw Mode* is enabled.
    - The *Keep alive interval* specifies the number of milliseconds to wait on an idle connection before sending a keep-alive message. The default is 1000 milliseconds or 1 second.
    - The *Keep Alive Time*out specifies how long *PortShare* should wait for a keep alive response before timing out the connection
- *Disable Nagle Algorithm* — the Nagle Algorithm is enabled by default and it reduces the number of small packets sent by *PortShare* across the network

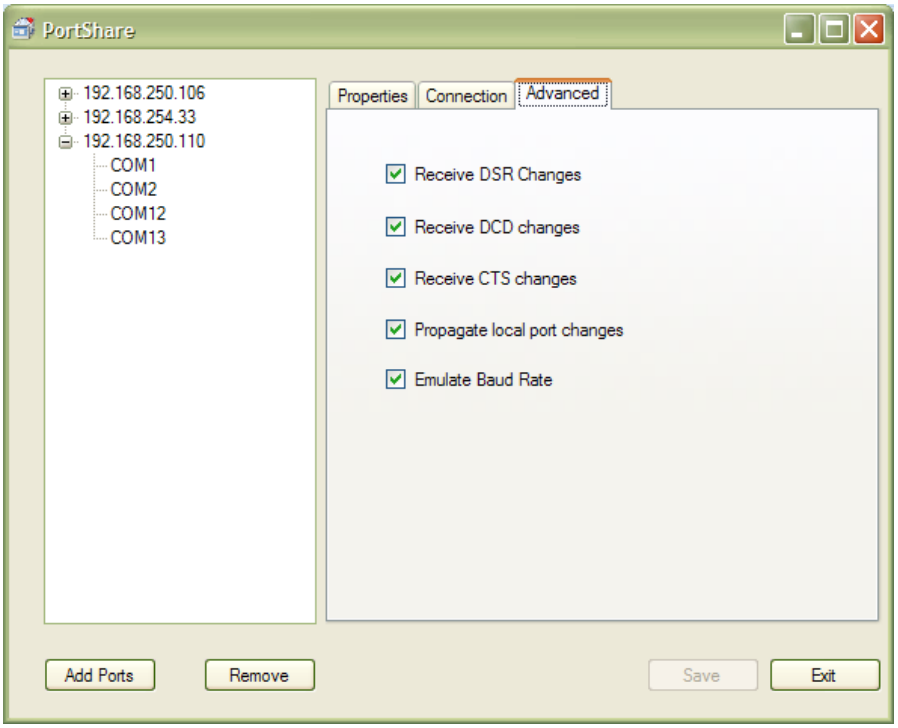


1.2.3 Configure COM *Advanced* Settings

- Check *Receive DSR/DCD/CTS changes* if the flow control signal status from the physical serial port on the *console server* is to be reflected back to the Windows COM port driver. Ssome serial communications applications prefer to run without any hardware flow control i.e. in “two wire” mode

- The *Propagate local port changes* allows complete serial device control by the Windows application so it operates exactly like a directly connected serial COM port. It provides a complete COM port interface between the attached serial device and the network, providing hardware and software flow control. So, for example, the baud rate of the remote serial port is controlled by the settings for that COM port on Windows computer. If *Propagate local port changes* is not selected, then the serial port configuration parameters are set on the *console server*

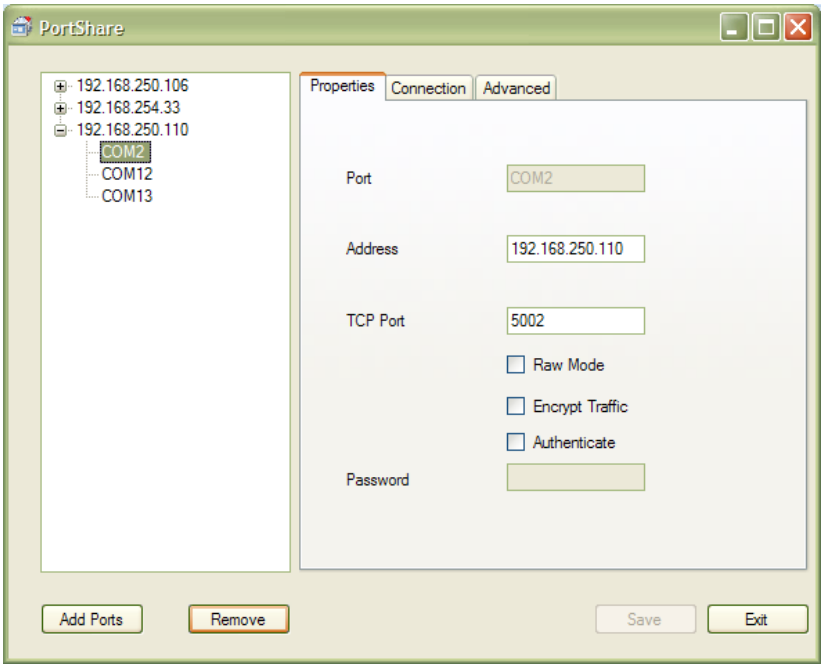
- With *Emulate Baud Rate* selected, *PortShare* will only send data out at the baud rate configured by the local application using the COM port



1.3 To remove a configured port

At any stage, you can delete a single configured COM port, or delete the *console server* connection and all the COM ports configured on that *console server*

- Select the *console server* or COM port from the left-hand menu
- Click the *Remove* button



1.4 Configure the remote serial device connection

Ensure the remote serial device is connected to your remote *console server*. Then configure the serial port as detailed in the Opengear User Manual:

- Set the serial port's Common Settings (e.g. baud rate)
- Check the *Console Server* Mode button and specify the appropriate protocol to be used:
  - *RAW TCP* allows connections directly to a TCP socket and the default TCP port address is 4000 + the serial port number (*i.e.* the address of the second serial port is *IP Address _ 4002*)
  - *RFC2217* enables serial port redirection on that port. The default TCP port address is 5000 + the serial port number(*i.e.*the address of a 48 port *console server* would be IP Address _ Port(5001 – 5048))
  - *PortShare Secure* mode enables encrypted communication

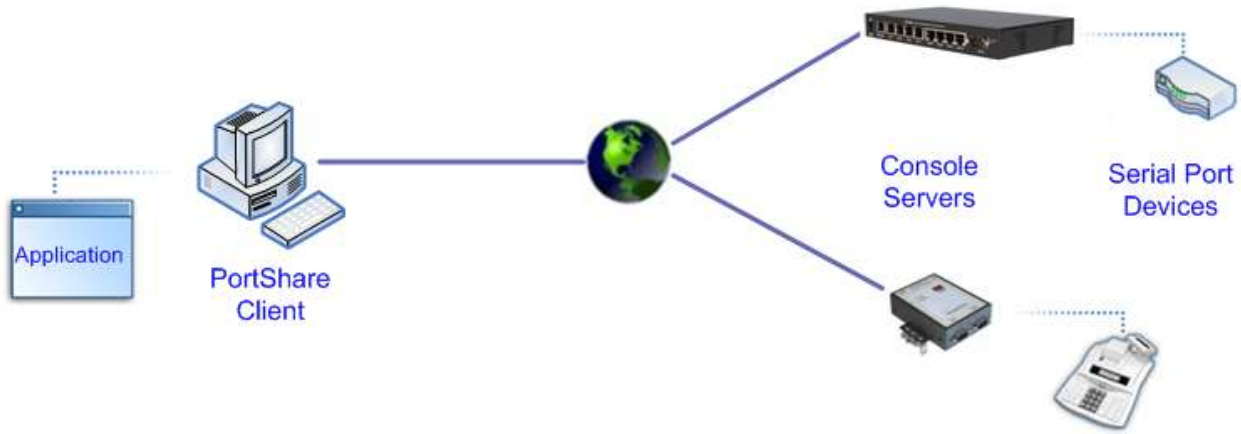
2. *PortShare* for Linux

The *PortShare* driver for Linux maps the *console server* serial port to a host *tty* port.

Opengear has released the ***portshare-serial-client*** as an open source utility for Linux, AIX, HPUX, SCO, Solaris and UnixWare. The General Public License agreement is included in Chapter 3 and the utility can be freely downloaded from ftp://ftp.opengear.com.

This *PortShare* serial port redirector allows you to use a serial device connected to the remote *console server* as if it were connected to your local serial port. The *portshare-serial-client* creates a pseudo tty port, connects the serial application to the pseudo tty port, receives data from the

pseudo tty port, transmits it to the *console server* through network and receives data from the *console server* through the network and transmits it to the pseudo-tty port.



So using this driver, you can use a remote console serial port as a local *tty* port and control remote serial devices as though they were attached locally to the Linux host. The driver can run under Linux kernel 2.4.x (supporting IPv4 only) and Linux kernel 2.6.x (supporting IPv4 and IPv6)

To map a *Console Server* serial port to a host tty port, you first need to setup the *console server* and attach and configure the serial port device:

- Ensure the *console server* IP configuration is valid and that you can access the unit successfully (eg: using ping or telnet)
- Configure the *Console Server* serial port to RAW TCP or RFC 2217 mode

Then you will need to install driver files into the host as detailed in 2.1 below.

2.1 Install the *PortShare* Linux driver

These simple installation instructions point to the appropriate configuration files and man pages:

2.1.1 To build and install the *PortShare* package (as root):

$ ./configure && make && make install

Note that the `--prefix=' option is ignored by configure.

2.1.2 Configure the devices by editing */etc/portshare-devices*. There are sample configurations in there, and the format is documented at the top of the file, or in the *portshare-devices* man page.

2.1.3 Start the *Portshare* devices:

/usr/local/sbin/portshare-serial-client start

(man portshare-serial-client for more information)

2.1.4 Useful commands:

portshare-stty

Used like 'stty', but applies the settings to the remote serial port correctly. A normal stty on /dev/ottyXX will not set the parameters on the port correctly, since it is just a pseudo-tty

2.1.4 Caveats

The local unix tty devices setup are just symlinks to pseudo-tty devices, so settings on those devices do not get set on the *Console Server.* To do this, use *'portshare-stty'*.

This also means that applications that rely on setting tty parameters such as baud rate, modem signals, etc will not work unless they are started with the *libportshare-ser-cli.so* library preloaded.

e.g. *LD_PRELOAD=/usr/local/lib/libportshare-ser-cli.so stty -a < /dev/otty01*

Use */usr/local/sbin/portshare-stty* as a template for running your application with the library preloaded.

2.2 *PortShare* command man pages

portshare-devices.txt is the man page for the portshare-devices configuration file. It is the more formal explanation without examples.

portshare-ser-cli is the man page for the binary .c program, or backend which does the actual work.

portshare-serial-client is the man page for a script. This script acts as the front end, or interface into the portshare-ser-cli binary.

2.2.1 portshare-serial-client(8)

NAME

portshare-serial-client Serial Port Interface for *Console Servers*

SYNOPSIS

portshare-serial-client (start | stop | restart | status) [devname]

DESCRIPTION

For each physical port listed inthe portshare-devices file, portshare-serial-client controls the status of the corresponding portshare-ser-cli interface

OPTIONS

portshare-serial-client must be invoked with one of the mandatory options including start, stop, restart or status and optionally with an argument associated with a specific device. In this case, the action specified as the option will be performed only for this device.

If this argument is not supplied, the action will be performed for all devices listed in portshare-devices file. The mandatory options include:

- *start* - Starts the portshare-ser-cli program, using parameters supplied in the portshare-devices file. If this program is already running, a message will be displayed, and no additional copy will be started.
- *stop* - Stops the portshare-ser-cli program(s), by issuing a SIGTERM signal.
- *restart* - Simulates a hang-up to portshare-ser-cli program(s), by issuing a SIGUSR1 signal.
- *status* - Checks the status of portshare-ser-cli programs(s).

EXAMPLE

Assuming the following portshare-devices file configuration:

/dev/ctty01:pr3k:1:rtelnet: /dev/ctty02:pr3k:2:socket:

1. Start all devices: portshare-serial-client start
   Messages: "Starting /dev/ctty01 <==> pr3k:1 interface" "Starting /dev/ctty02 <==> pr3k:2 interface"

2. Try to start them again: portshare-serial-client start
   Messages: "portshare-serial-client : /dev/ctty01 already active" "portshare-serial-client : /dev/ctty02 already active"

3. Stop only /dev/ctty01 device: portshare-serial-client stop/dev/ctty01
   Messages: "Stopping /dev/ctty01 <==> pr3k:2 interface"

4. Checking status: portshare-serial-client status
   Messages: "/dev/ctty01 (rtelnet at pr3k:1) is inactive" "/dev/ctty02 (socket at pr3k:2) active, pid 2983"

5. Start a non-valid device portshare-serial-client start /dev/xtty01
   Messages: "portshare-serial-client : device /dev/xtty01 does not exist"

2.2.2 portshare-ser-cli(8)

NAME

portshare-ser-cli Serial Port Interface for *console servers*

SYNOPSIS

portshare-ser-cli [options] devname rasname physport

DESCRIPTION

The portshare-ser-cli program connects a Unix device file, devname, to a physical port, physport, of an Opengear *console server,* rasname. portshare-ser-cli provides the I/O interface between the device file and the physical port, running as an user-mode device driver.

If physport is assigned to 0, then rasname is used as the IP address on an IP-based serial port addressing.

OPTIONS

portshare-ser-cli may be started with the following options:

- u ptyiosize
  Sets the internal device I/O size to ptyiosize (maximum: 4096 bytes, default: 1024 bytes)
- n netiosize
  Sets the internal socket I/O size to netiosize (maximum: 512 bytes, default: 128 bytes)
- i retrydelay
  Delay in seconds between connection requests (default: 60)
- r retries
  Number of connection request retries before exiting. (default: infinity)
- s
  Use the Socket Server protocol for talking to the server, this means just piping all the data down a TCP connection with no control information, so it's impossible to change the port speed etc. The default is to use the RFC2217 protocol.
- m modem handling
  The default is 0 which means to check DCD state, 1 means to ignore DCD.
- c close mode
  Last close handling; the default is 0 which means to hangup the modem, 1 means not to hangup.
- p start port
  TCP base port of servers at *console server* side (default: 5000 for RFC2217 Server). Note: if physport is assigned to zero, this option has no effect, the Telnet Server standard port (23) is used.
- d debug level
  The default is debug level 0 (little debugging), level 1 debugs internal state changes, level 2 debugs events, and level 3 debugs IO calls.
- f
  Run in foreground, this is suitable for running from init.
- x
  Console mode: normally all messages are sent to syslogd (using local2 facility). With this option, all messages will be sent to stdout and portshare-ser-cli runs in the foreground. This implies -f
- P
  Specify a TCP port to connect to. If this option is present, it will override most other options in the /etc/portshare-devices file. portshare-ser-cli will use this TCP port instead of deriving it from –p and physport. This option is useful when connecting to a local TCP port, which is connected to an ssh tunnel.

USE

Every instance of portshare-ser-cli will have a virtual serial device which is a sym-link to a pseudo-tty. A terminal program can then talk to the virtual serial device and it's data transfers

will be redirected across the network. Each virtual serial device will be accompanied by a UNIX domain socket with the same name with the addition of ".control". So if portshare-ser-cli provides the virtual device named "/dev/modem" then it will have a control socket named "/dev/modem.control". There is a shared object named libportshare-ser-cli.so which intercepts calls to the tcsetattr() and tcsendbreak(). This shared object then sends the relevant data to the portshare-ser-cli server via the control socket. To recognize a virtual modem device, it has to read /etc/portshare-devices.

The libportshare-ser-cli.so shared object can be loaded per-application through the LD_PRELOAD environment variable, or for the entire system through the system shared object configuration (see the OS documentation). Note that the LD_PRELOAD environment variable has to have the fully qualified path of the object; otherwise an application which changes its current directory may fail.

BUGS

In Solaris, libportshare-ser-cli.so does not work with the stty program. stty uses a different interface to this and requires some extra coding.

In Solaris, libportshare-ser-cli.so conflicts with some system programs, such as ps, for unknown reasons. It is advised not to load it for those programs. It has no such problems with any serial communications programs.

Example.

Start an interface between /dev/prt1 device and serial port number 10 on a *console server* named pr01, without hang-up at last close:

portshare-ser-cli -c 1 /dev/prt1 pr01 10

In general use, do not start portshare-ser-cli from the command line. Start it through the portshare-serial-client script or from init.

2.2.3 portshare-devices(5)

NAME

portshare-devices - tables for driving portshare-serial-client

DESCRIPTION

The portshare-devices file supplies all mapping between Unix device files (/dev/*) and the addresses of serial ports of *console servers*. It contains one entry for each serial port, with the following format:

device:rastype:rasname:physport:type:options

Note: A # character at beginning of line indicates a comment

The entry fields are:

devname

- The full pathname of the file that will be associated with the serial port. It must start with a "/dev/" prefix. Two naming schemes may be used here:
  - devname does not exist, and will be linked to a free pseudo-tty. This is the default behavior of portshare-ser-cli.
  - devname is the name of a valid slave pseudo-tty. In this case, the “t 1” option must be assigned in the options field. (Note: this option is not supported by this release).

rastype

- Console server type:
  - cm4001, for Opengear CM4001
  - cm4008, for Opengear CM4008
  - cm4116, for Opengear CM4116
  - cm4148, for Opengear CM4148
  - sd4002, for Opengear SD4002
  - sd4008, for Opengear SD4008
  - im4208, for Opengear IM4208
  - im4216, for Opengear IM4216
  - im4248, for Opengear IM4248
  - img4004, for Opengear IMG4004
  - acm5002, for Opengear ACM5002
  - acm5003, for Opengear ACM5003
  - acm5004, for Opengear ACM5004

rasname

- Host Name or IP Address of the *console server* where the serial port resides.

physport

- Number of physical port in the *console server*. If treated as the IP address associated with this port, in a IP-based addressing scheme.

type

- Server type that will be contacted to handle the serial port:
  - rfc2217, for RFC2217 serial support
  - rtelnet, for Remote Telnet Server - socket, for Raw TCP Socket Server

options

- Per-port specific options, passed to portshare-ser-cli program.

FILES

/etc/portshare-devices

2.3 Some *PortShare* application examples

These examples show the actual virtual port configuration and explain how the configuration should be done, using examples:

/etc/portshare-devices

Entry Syntax:

devname:cmtype:cmname:physport:type:options

where :
devname -> Device full pathname

rastype -> *Console server* type (cm4008, CM4116 or CM4148)

rasname -> *Console server* host name or IP address

physport -> Physical port number on *console server*

type -> Server type : rfc2217 or socket (raw TCP)

opts -> per-port interface options (optional)

To connect via a secure ssh tunnel, use the '-P' parameter as part of "opts", and give the TCP port number used for the local end of the tunnel. e.g. "-P 22222" will attempt to connect to local TC port 22222. Also set the rasname to "localhost". (Note: The ssh tunnel must already be setup for this to work).

Example 1.

Connect to port 1 on a 48 port *console server,* such as cm4148, at IP address 10.111.254.1, using RFC2217:

/dev/otty01:cm4148:10.111.254.1:1:rfc2217

Example 2.

Connect to port 8 on a CM4008 *console server* at IP address 10.111.254.2, using RFC2217:

/dev/otty02:cm4008:10.111.254.2:8:rfc2217

Example 3.

Create an ssh tunnel from localhost to *console server.* This tunnel connects to serial port 3 on the *console server* and uses rfc2217. Assume the rfc2217 TCP port base on the *console server* is set to the alternate value of 9000 (whereas, by default, it would be 5000). The local TCP port used for the tunnel is 12345:

ssh -L 12345:10.111.254.3:9003 <username>@10.111.254.3 -N

Now use this tunnel to make the connection:

/dev/otty03:cm4008:localhost:3:rfc2217:-P 12345

3. *PortShare* License Agreements

3.1 End User License Agreement - *PortShare* for Windows

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3.2 End User License Agreement - *PortShare* for Linux

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